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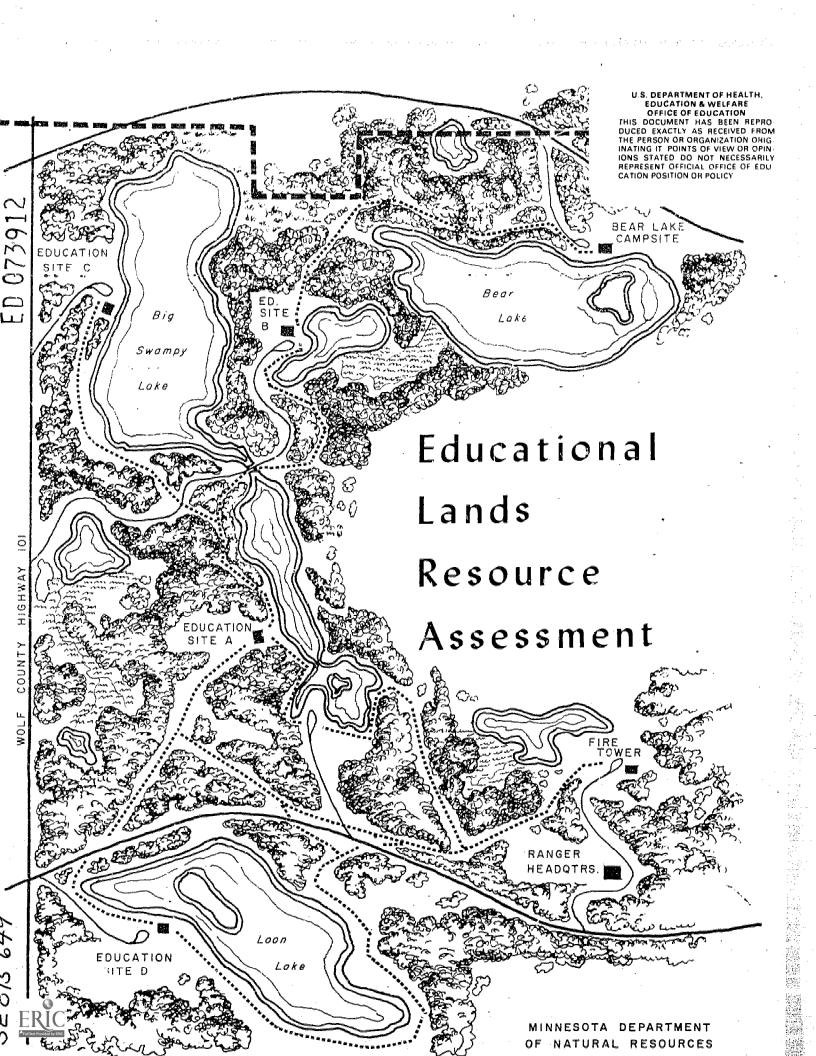
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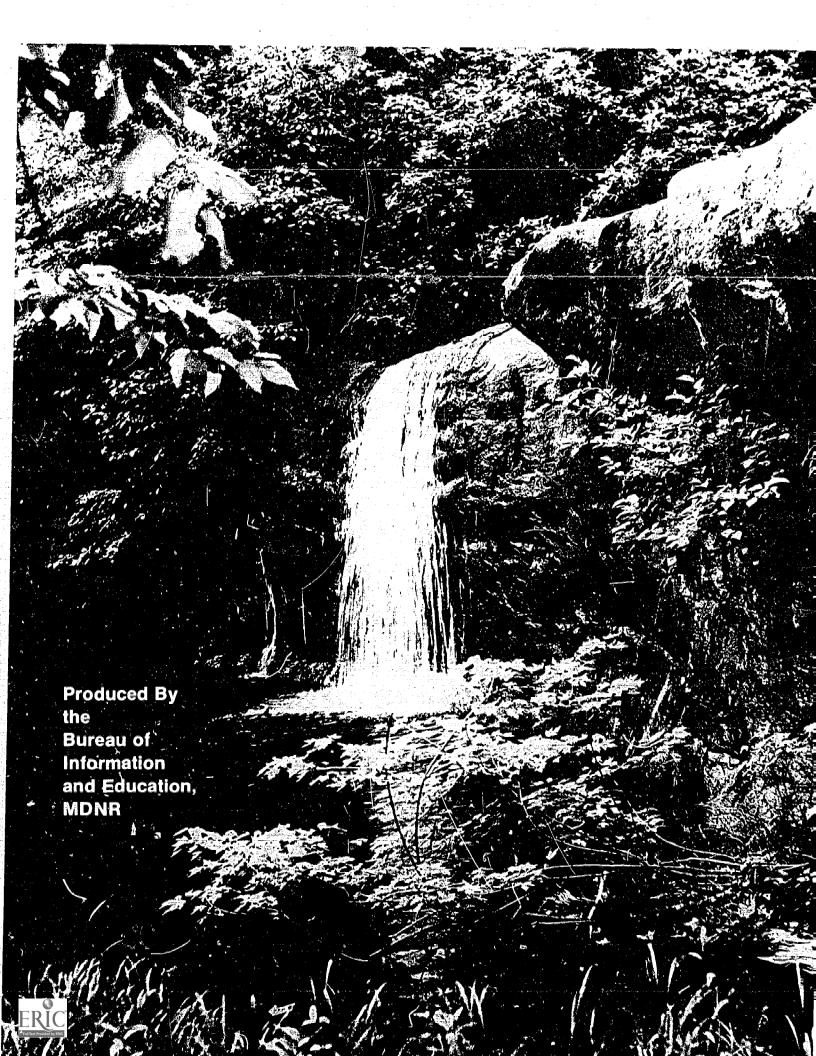
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AESTRACT

Suggestions offered in this manual may aid in the formation and maintenance of an environmental education program. It is designed to encourage the use of the outdoor classroom, to provide a means of assessing the appropriateness of a particular site for environmental education purposes, and to suggest how such a site may be maintained for continued use in an environmental education program. Criteria for the selection of sites are enumerated, considering uniqueness of potential use, feasibility of the site for a particular use, and the capabilities of withstanding the impacts of use. Also, criteria are included by which the effects of use on the site can be determined, involving site modifications necessary to lessen the effects of use and periodic upkeep. Several inventories are described and recommended in addition to a general site inventory: comfort and safety, educational value, and environmental education potential. Other charts note educational needs and techniques, the focus of environmental education, land needs, problems associated with the area, recommended density use, and effects of use. (BL)





Educational Lands Resource Assessment



by Karen Jostad

The Educational Lands Resource Assessment manual is an attempt to help teachers, students, and interested community members select, use, and maintain a site on public or private lands where they may conduct environmental education activities. As environmental education programs have expanded, efforts have been made to seek sites outside the classroom where these activities can take place. School properties are often poor for these purposes because they have been leveled and denuded of vegetation in the process of constructing buildings and facilities. Public land managers are encouraging schools to use public lands for education purposes, and some private owners w... loan land for educational use. As yet, few schools have taken advantage of accessible public and private properties because either they are not aware the lands are available for educational purposes or they have no procedure for assessing the educational potential of a site.

The Educational Lands Resource Assessment is designed to aid in the formation and maintenance of an environmental education program developed and managed by teachers, students, and interested community members. State Natural Resource Managers and teachers are available to help instigate the Educational Lands Resource Assessment as they will the

program itself, but the land and site assessment data collection and analysis is quite capable of being mastered by students with assistance from teachers and local residents who may be quite eager to join in.

Selection of educational sites should emphasize uniqueness of potential use, feasibility of the site for a particular use, and capability of withstanding the impacts of use. The Educational Lands Resource Assessment manual enumerates criteria for the selection of sites with these considerations in mind.

The use of the site should be planned and purposeful. Activities, investigations and involvements should be developed specifically for the site or should be adapted to the site from existing materials. Change and growth should be inherent in any environmental education program. The results of the Educational Lands Resource Assessment can be used as a basis for planning and activity development.

Site management involves site modifications necessary to lessen the effects of use (e.g. wood chip paths), and periodic upkeep combined with assessment of the effects of use. The Educational Lands Resource Assessment includes criteria by which the effects of use on the site can be determined.

Many individuals are available nearby who have the expertise to aid with an Educational Lands Resource Assessment. Of primary importance are people whose talents, time, and interest are available within the community. Seek them out. Their interest is necessary for a viable environmental education program. They may be willing to help financially as well as with their time and expertise. Involving community residents in such a project is an ideal way to create good will towards and interest in the public schools as well as take advantage of the deep knowledge some local residents have of the area.

The State Department of Natural Resources is an excellent source of aid for environmental education programs including the conduct of the Educational Lands Resource Assessment. Department of Natural Resources Managers and teachers in each geographic region are available to arrange practice assessment sessions for a number of interested teachers so that the teachers in turn can help the students work through one. Contact the Bureau of Information and Education, DNR, to learn their names and where they may be reached. If problems arise beyond their expertise they will be able to suggest others who may be better able to solve the difficulties.

The State Department of Education can recommend appropriate activity materials.

The Soil Conservation Service is an excellent source of information about the soil and topography in the vicinity; it may be able to supply specific data on sites tentatively selected, and may possibly have on hand some local resource directories they will send out. The Soil Conservation Service personnel are often quite willing to help educational groups.

The Environmental Science Center at Golden Valley has demonstrated for several years its readiness to aid schools and communities with site development and community inventories.

The following volumes indicate local resources in comparison with state resources:

Atlas of Minnesota Resources and Settlement Minnesota State Planning Agency copies are available from:

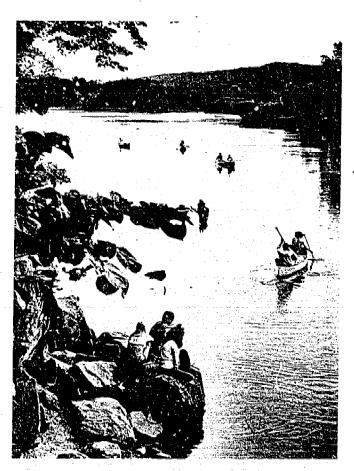
Documents Section 140 Centennial Building St. Paul, Minnesota 55155

Background Information for Framework Statewide Water and Related Land Resources Planning in Minnesota

copies are available from:
State Planning Agency
603 Capitol Square Building
St. Paul, Minnesota 55101

Natural Resource Planning Atlas of Minnesota copies are available from:

Minnesota Department of Natural Resources
Division of Game and Fish
Centennial Building
St. Paul, Minnesota 55155





Selection of a Site

Outline Environmental Education Needs

The first prerequisite in the selection of a site is to determine the school's environmental education requirements and needs. Many schools have environmental education in some form. A questionnaire like the one below distributed to the teachers may help to assess present environmental education programs and activities.

| Class Description | |
|---|---|
| Which of the following most closely describes the focus o classroom? | f the environmental program in your |
| Pollution or environmental degradation | on |
| Ecology | |
| Man-land interrelationship | • . |
| Community studies (people and instit | utions) |
| Nature appreciation | • |
| Which of the following most closely describes techniques environmental education? | you find most successful in teaching |
| Fact-giving | Problem solving |
| Emotional appeal | Involvement in community environmental problems |
| Selected experiences | Investigation and data collection |
| Describe an environment education study site which would | assist your present or future needs: |
| | |

In order to select the most appropriate sites, it may be necessary for the school to formulate a coordinated environmental education program using the questionnaire data and information gathered from discussions with teachers. It may also be helpful to create a description of a site that would best suit the needs of most teachers who have an environmental education program. The data sheet below should aid in the compilation and analysis of information gathered describing environmental education needs. (See following table.)

Policy and facility restrictions may also affect the choice of a site suitable for an environmental education activity. Factors to be considered are time limitations for travel, busing, provision of food, securing of necessary approval from the central administration or school board, existing policy concerning field trips, and teacher liability.

Select Tentative Sites

Once the environmental education needs of the school have been outlined, tentative sites should be located.

A Site-Selection Committee made up of interested teachers, students, and community residents can function to correlate the school's environmental education needs with the sites available. It would be the committee's task to approach land-holding agencies in order to determine their willingness to loan some part of their land for environmental education use.

Sites may be sought among a number of sources. In some cases, schools already own lands suitable for environmental education activities. Other sources are federal lands administered by the United States Forest Service, the Bureau of Land Management, the Corps of Engineers, the Bureau of Indian Affairs, and the Bureau of Sports, Fisheries and Wildlife; state lands, forests, parks, highways, institutional grounds, and lands administered by the Game and Fish division of the Department of Natural Resources; local lands include county-owned property and tax forfeited properties.



| FOCUS OF ENVIRONME, TAL EDUCATION |
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|-----------------------------------|---|----|---------|---|--------------------|----------|---------|-------------------|---|------------|----------------------------|
| | Investigation and Data Cellection | | | | | | | | | | |
| | Involvement in Community Problems | | | | | | | | | , | |
| TECHNIQUE | Problem Solving | | | | : | | | | | | * |
| EDUCATIONAL, TECHNIQUE | Selected Experiences | | | | | | | | | r | |
| _ | Emotional Appeal | | | | · | | - | | , | | |
| | Fact Giving | | | | | | | | | | |
| | Nature Apprectation | | | | | | | | | | |
| ATION | Community Studies | | | | | | | | | | |
| FOCUS OF ENVIRONME, TAL EDUCATION | Man-Land Inter- relation- ships | | | | | | | | | | |
| OF ENVIRONA | Ecology | | | | | | | | | , | |
| FOCUS | Pollution or Environ- mental Degradation | | | | · | | | | | | |
| IC. | Class Description | | K-6 7-9 | | Natural Science | Physical | Science | Social Science | | Humanities | Check if site would assist |

LAND NEEDS

| | · · | | | | | | |
|----------------------------|-------------|--------|------|---|--------------------------------------|---|--------------------------|
| No. of Respondents | | | | | | | |
| Specifics from Respondents | | | | need area for contour map- ing by vo-ed students | would like native prairie grasses | beaver pond, heron nesting area, erosion | old cemeteries, 19th |
| General Category | wooded area | stream | puod | topographical complexity | meadows, grass- land | unique ecological features | sociological features |

PROBLEMS

| General Category | Specifies from Respondents |
|---------------------|------------------------------------|
| physical facilities | toliets, picnic tables |
| travel needs | must be within ½ hr. travel time |
| accessibility | accessible to handicapped students |
| familiarity | |
| (a) Stajic | , |

Other sources include lands owned both privately and by businesses. Community organizations, speculators and real estate agents may be willing to loan a portion of their lands for environmental education purposes. If such lands are used, it is often wise to acknowledge the favor with a prominent sign posted on the site, such as "The Chapter of the Masons have provided these lands for environmental education".

Managers of government lands are often anxious to promote the use of public lands for environmental education. In many cases they are willing to make some site modifications or provide shelters.

The selected textative sites—should be subjected to preliminary analyses (or inventories) by the Site-Selection Committee with the help of the Resource Manager if one is available. The preliminary analyses will determine the potential educational value of the sites and their potential for providing a safe and comfortable learning experience. The results of these inventories are recorded on paper maps by means of codes that will be transferred to maps printed on transparencies. When the transparencies are overlaid, they will indicate the most favorable site for the schools' environmental education activities.

The materials needed for the site inventories are:

Contour maps. The Natural Resources Manager may be able to provide them. If not, they can be obtained from a map supplier or ordered from the Geologic Survey. The Index to Topographic Maps of Minnesota contains the particular name and series number of

any site. The maps are \$.50 each and are ordered from:

Distribution Section

Geologic Survey

Federal Center Denver, Colorado 80225

They can also supply a booklet entitled *Topographic Maps* that gives instruction on how to read topographic maps.

water-proof marking pens.

Overhead transparencies of the contour maps.

The section of the map showing the site should be cut out and reproduced in large quantities, by students in graphic arts. If the site is small, blow it up to a useful size.

Each criterion to be mapped represents a different characteristic of a given site; for example, marsh. Only one criterion is recorded on each paper map and each transparency. Recording of the type of criteria on the map is limited to three designations; diagonals for unfavorable, dots for moderately favorable, and no color at all for very favorable. Collection of criterion data in the field should be made on the paper maps with water-proof marking pens.

The data is transferred to the transparent maps, using the same designations. When all are overlaid, the parts of the site that are most desirable for all the criteria recorded are the lightest. These transparencies can be used separately or together for different kinds of analysis and display.

First a master map indicating the site resources can be prep. ed and used as baseline data when interpreting the data collected in the inventories.

RESOURCES SUPERIMPOSED ON CONTOUR OR ROAD MAP

| cological Boundaries | | * | |
|-------------------------|-------|----------|-------|
| Forest | | | Green |
| Meadow or Field | | | Green |
| Streams | . • . | \sim | Blue |
| Open Wates | | | Blue |
| Flood Plain & Shoreland | • | | Blue |
| Marsh | | . | Blue |
| Rock | • | | Red |

Comfort and safety inventory

In order to realize the greatest learning potential from a site it is necessary to consider the prevalence of comfort and safety factors, in relation to the ages of the students, the kinds of activities they are to conduct and the amount of supervision to be provided. If the results of the suggested comfort and safety inventory indicate many hazards and annoyances, the learning potential may be cancelled out. In such a case the site can be eliminated or it could be somewhat modified. Following are some suggested criteria for determining the amount of comfort and safety.

| Comfort and Safety | mosquitoes " | flies | breeze | humidity | sun | wet | heavy vegetation | walking | eating | heat (summer) | cold (summer) | cold (winter) | hazard (summer) | hazard (winter) |
|--------------------------|--------------|-------|--------|----------|-----|-----|------------------|---------|----------|---------------|---------------|---------------|-----------------|-----------------|
| small stream-waters edge | | | | | | | | | | | | | | |
| small stream-in water | | | | | | | | | | | | | | |
| large stream-waters edge | | | | | | | | | | | | | | |
| large stream-in water | | | | | | | | | | 1 | | | | |
| marsh | | | | | | | | | | | | | | |
| flood plain | | | | | | | <i>sanaga</i> | | | | | | | |
| forest lowland | | | | | | | | | | | | | | |
| forest upland | | | | | | | | | | | | | | |
| meadow lowland | | | | | | | | | | | | | | |
| meadow lowland | | | | | | | | | | | | | | |
| meadow upland | | | | | | | | | | | | | | |
| bluff's edge | | | | | | | | | <u> </u> | | | | | |
| picnic grounds | | | | | | | | | | | | | | |
| main roads | | | | | | | , | | | | | 111 | | |
| side roads | | | | | - | | | | | | | | | |
| walking trail-bluff | | | | | | | | | · | - | | | | |
| walking trail-lowland | | | | | | | •. | | | | | annun | ununnh | |
| walking trail-upland | | | | : | | | | | | | | | | |
| dumps-waste disposal | | | | | | ., | | | | | | | | |



Preliminary Educational Value Inventory

To quickly assess the educational value of the sites, a preliminary mapping inventory using the kinds of criteria suggested below should be carried out. The criteria are not quantitative because the significance of various degrees of a characteristic is relative to a given area. For example, in the plains of southern Minnesota a slope of 25% might be of much more interest than it would be in

northeastern or southeastern Minnesota. The most favorable vantage points for viewing would allow the student to view the entire site, and would be left without color on the map. There are both good and poor examples of typical transition zones to be found in any area, as there are both good and poor wildlife habitats. These should be appropriately coded on the maps.

Educational Value of the Study Site

Slope

Bedrock of Geologic Interest

Vantage points for viewing

Transition Zones

Wildlife Value

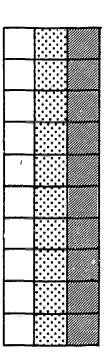
Unique Features

Plant Variety

Aquatics

Historic Value

Social Value



SITE USE AFTER SELECTION

Environmental Education Potential Inventory

After a site or several sites have been chosen, a comprehensive environmental education potential inventory should be conducted using the mapping procedure outlined earlier.

The following criteria are samples of these that help illuminate the environmental education potential of a particular site. They indicate some of the ecology, geology, social, historical, and topographical characteristics of a given area. Each characteristic is subsumed under a heading that represents a possible study focus. When the transparencies are completed and overlaid, the open spaces will indicate site areas where the study could be most favorably conducted. (See chart pp. 8-9.)

Initial site inventories can comprise the beginning of an accumulation of maps indicating the socio-ecological characteristics of a given site, that is all man-made and natural systems. The file will record the history of the use of the site for environmental education and the

changes in its ecological characteristics. If the site is very large, actual completion of the initial inventories may take several years; the collection can indicate what parts of the inventories have not been finished. If the site is smaller, site inventories should be taken annually and, in some cases, biannually. The file of inventory maps can be kept at the school or at the site headquarters if arrangements can be made.

When the initial inventories are complete, the site characteristics should be compared to the environmental education needs of the school. If the sites do not entirely meet the school's needs, a few may yet be unique enough to be valuable for some environmental education activities. The findings of both the needs assessment and the site inventories should be presented to teachers, students, and interested community residents by the Site-Selection Committee.

EDUCATIONAL POTENTIAL

INVENTORY Biological Diversity least most diverse diverse Tree types mixed mono evergreen deciduous deciduous Soil types loam sand 3 Vegetative Class marsh wooded open Effect of Slope on Environment least most obvious obvious effect effect Slope 10-25% over 25% 0-10% Slope Facing east or south north west bare Slope Cover wooded vegetation Agriculture Impacts least most impact impact Crops row crops mixed hay fields garden Farming Methods contour. flat land, hilly land.

no special

methods

no special

| Pastureage | Hill pastures | Open field pastures | Woods, pastures, flat land |
|------------------------------------|--|---|---|
| Herd Density | 5 animals | 2 animals | 1 animal |
| Drainage | | | |
| Surface Waste | lakes, ponds, streams, marshes | saturated soil | no surface or soil water |
| Condition of Surface Water | heavily silted, muddy | орацие | clear |
| Land Conditions | eroded gullies | alluvial fans at base of hills, no deep gullies | no physical marks such as dry gullies |
| Soil Substance | sand & | silts and clay | bedrock |
| Land Surf | ace | | |
| Surrounding Home Value | over \$50,000 | \$25 to 50,000 | less than \$25,000 |
| Surrounding Land Value | over \$3.00/ | \$2.00-3.00/ ft.2 | less than \$2.00; ft.2 |
| Desirabilit | | by fron-educ | 1 |
| | · . | | interests |
| Unique Natural Values | no unique value | unique open areas | seenic beauty |
| Recreational Jse | no value | picnicking, hunting, fishing, swimming | water skiing, snow- mobiles, trail bikes |
| Historical | Content V | aluable to E | nvironmental |
| | · | | Education |
| and Use Artifacts and lividence | old mines and quarries | worn out farmlands, cut over land | past resi- dential area, no buildings, plantings, etc. |
| Cemeteries | Est. before | Est. 1900 to 1930 | Est. after 1930 |
| rchaeological lites | Being ex- cavated by responsible | | No evidence |



Invertebrate Populations Flying (2 sweeps, more than with insect net) 10 Leaf Litter (one more than packed sandwich bag) (berlese tunnel) Pond Areas Shoreline intervery sparse dense deep Vegetation Eutrophication Middle Young (nutrient Aged (clear, sterile)

Site Activities

Each site can be a locus for a number of activities adapted to it. Activity materials that can be adapted are available from a number of sources. Activities have been specifically designed so that they disrupt the natural environment as little as possible. Activity manuals can be procured from

State of Minnesota Department of Education Capitol Square Building St. Paul, Minnesota 55101 Request; Environmental Education Mini-Unit Series

Environmental Science Center 5400 Glenwood Avenue Golden Valley, Minnesota 55422 Request: Lessons and Teacher Resources List

National Wildlife Federation
1412 - 16th St. NW
Washington, D.C. 20036
Request: Information about ordering the Environmental Discovery Series

Earth Space Science Curriculum Project Box #1559 Boulder, Colorado 80302 Request: Environmental Studies Package I and II

Benefic Press Co. 10300 W. Roosevelt Westchester, Illinois 60153 Request: Information about the Eco-Lab Biological Sciences Curriculum Study
D. C. Health and Company
Boston, Mass.
Request: Laboratory Block-Ecology
Mine Publications Inc.
25 Groveland Terrace
Minneapolis, Minnesota 55403
Request: Environmental Studies Series
New York State College of Agriculture
Cornell University

Ithaca, New York Request: Cornell Rural Schools Leaflets

These guides form a basic collection of curricula from which a program of environmental education studies for the site can be designed. A good adaptation of these activities to the site will help assure a continuing environmental education program. Additions to the existing activity texts should include information about the specific area in the site where a particular activity can be carried out most successfully, indications of problems students have had with the activity previously, time needed for travel, eating, and bathroom stops, suggestions for equipment to be built by students and sources of equipment already available, and resources to supplement the investigation. The activities should be kept in a central location so that all teachers, students and community members involved can have ready access to them.

The program should be flexible so that new material can be introduced as it is discovered or designed.

Site Maintenance

Initial Site Modifications

Some modifications of the site may be necessary the first time the site is used. These may need to be repaired, replenished or replaced periodically. They are the responsibility of the students and teachers using the site. Site modifications should be minimal for both economical and ecological considerations. However, brush removal, shelter construction, driveway construction and repairs and other projects may be necessary. These modifications should be recorded so that inventories of past years will indicate the periodic operations that need to be carried out. Water sources and toilet facilities may be provided by the Natural Resource Manager; however, students should help with modifications or supply them completely whenever possible. For example, a lean-to shelter could very well be constructed by the senior-high carpentry class. The Natural Resource Manager can check the modification to see that it can be approved, and may possibly aid in its construction. Community organizations and residents such as retired carpenters, parents, housewives, and senior citizens may also be willing to help.

Managing for Continued Use

A Site Management Committee should be formed and might include the Natural Resource Manager in charge



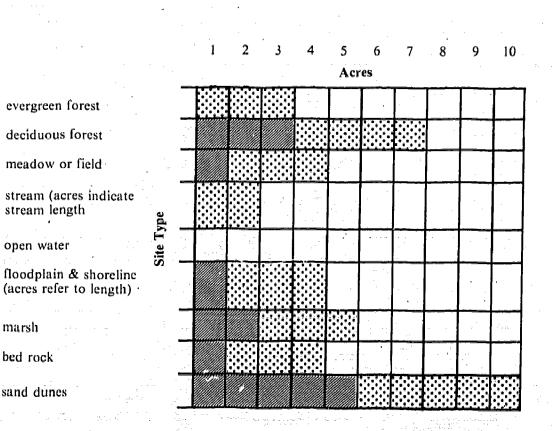
of the area (if lands are publicly owned), interested community residents, students and teachers. The Committee should be responsible for continually assessingthe effect of use on the site, revising the amount of use in order to alleviate harmful use effects and recommending and making plans for site modifications as the needs become apparent. For example, if paths are being worn in heavily used areas the Committee should investigate the need for surfacing the path or moving the activity. If the Committee decides to surface the path, they are

responsible for locating a source of free wood chips and finding community residents and students willing to help install the path.

One of the Committee's most important responsibilities will involve the determination of the most feasible amount of use for the site and the construction of a use schedule from the information. The following chart will aid in determining the most feasible density of use for any given site.

RECOMMENDED DENSITIES

| high density use; two classes of 30 students each at one week | intervals | |
|---|-----------|--|
| medium denisty use; one class of 30 students each at two week | intervals | |
| low density use; one class of 30 students each at one month | intervals | |





marsh

The assumptions incorporated in the charts are (1) even distribution of students over the site to be used. (2) only moderately consumptive activities (only insects, plants and soil samples are collected, and only one of each type of those is taken. Students have definite standards to follow when collecting specimens.) (3) there are no restrictions on foot travel and no structures to reduce use effect caused by foot travel. If travel is restricted it may be possible to increase the density of use per acre.

It may be useful to construct a map of the site that shows the amount of use density each area can withstand. First indicate where on the map the different kinds of habitat occur. Estimate the acreage of each habitat area in order to judge the density of use it can tolerate, then code that area accordingly. Areas can withstand a greater use density if sections within it are used in rotation. For instance, if a four-acre site can tolerate 30 students, use only two acres but increase the density to 20 instead of 15. Next time, use the other two acres.

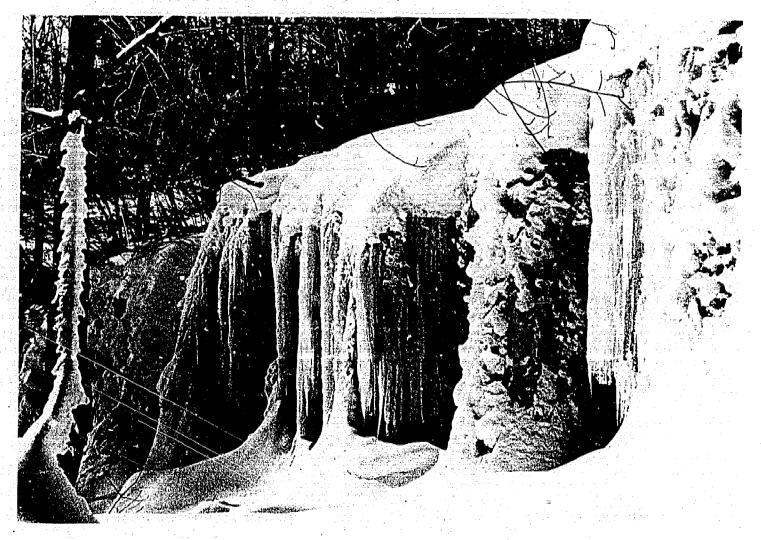
A use schedule can be constructed from the information given by the chart and knowledge of class size, periods of use, and consumptiveness of the activity.

Recording Effects of Use

Each group that uses the site for a study should be required to fill out an impact card at the conclusion of activity, and to file it with the site management Committee. This allows the Committee to constantly monitor the impact of use on the site. A sample card is illustrated. Note: "Taylor Slough" and "Prairie" are only examples. Prepare your own descriptions to fit the site.

| IMPAC | T CARD |
|-------------------------|-----------------------|
| DateStu | dy Group |
| Location of Study: | |
| NE Oak Woodlot | Taylor Slough |
| SW Oak Woodlot | Prairie |
| Noted Impact or Damage: | |
| | Description |
| 1 | Description |
| | Description |
| Litter Des | scription |
| Other | |
| , | damage? |
| | lanagement Committee) |





In addition to the impact cards, the entire group might compile an accumulative record of a year's use of each study area in the site using the impact cards of data. The impact record sheet below is an example of how the effect of use can be rated on an ordinal scale over a year's time. (See chart p. 23)

The criteria listed are only suggestions. Criteria specific to a particular site should be developed by the Site-

Management Committee.

Criteria to be assessed are listed and rated on a scale from 0 to 3. The numbers represent relative condition from, for example, poor (0) to excellent (3), or extinct species (0) to abundant species (3). The average of each of the criteria and a final overall average indicates whether the site condition is improving, staying the same or deteriorating. Management decisions can be made accordingly,

If problems of abuse of the situation arise, a committee of students, teachers, community members might prepare some regulations governing activity at the site to be discussed and passed on by the entire student body. Some sample regulations follow.

Insects are the only animals to be collected.

2. No soil samples may be taken without clearance from the Site Management Committee.

3. Plants may be collected whom necessary for interpretation of data, but only one representative may be taken. If only a few of a particular plant are exist in the area, they may not be collected.

4. Students doing aquatic investigations must wear life perservers.

Conclusion

The value of public and private lands as educational resources is becoming increasingly apparent. This manual is designed to encourage the use of the outdoor classroom, to provide a means of assessing the appropriateness of a particular site for environmental education purposes, and to suggest how such a site may be maintained for continued use in an environmental education program. By means of such programs, an appreciation for and wise use of natural resources will continue to grow while learning experiences will become more exciting and challenging.



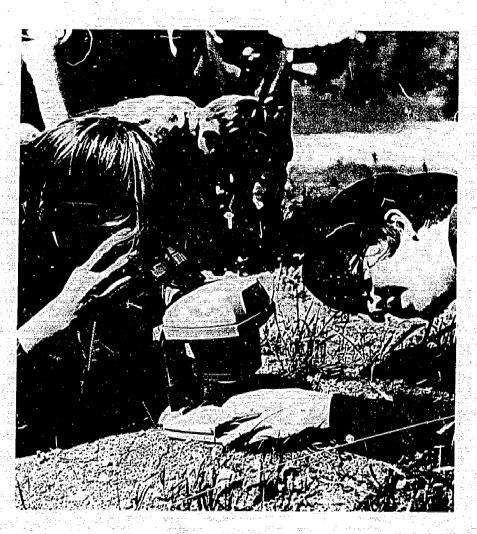
Site Condition - Effects of Year's Use

Site Study Area

(Note: Your chart should contain all 12 months)

| | | 1 | T | 1 | Γ | | 1 | 1 | T | <u> </u> | Τ | <u> </u> | |
|---------------------------------------|--------------|---------|----------|-----------|-------|-------------|-------------------------|----------------|---------|----------|-------------|-------------------------------|-----------------------------------|
| 0-1 site closed 2 examine site 3 none | Action Taken | Average | Drainage | Artifacts | Trees | Bushes | Ground Cover Vegetation | Unique Species | Erosion | Shelter | Access Road | (0) — poor (3) — excellent | Rate each category for each month |
| | | | | i | | | | | | - | | September | |
| , . | | | , | | | | | | • | , | - | December | |
| | | | | • | | | | | | | | April | |
| | | | | | | | | | | | | August | |
| Total Average for Year | | | | | | | | Lance | | | | Average | |

the outdoor classroom...





... holds the key to unlocking life's mysteries